a8 cancel. on operation of the motor and a second magnetic means including a permanent magnet mounted to said rotatable assembly so as to provide a magnetic preloading on said assembly when said current is not being supplied to said first magnetic means.

REMARKS

The office action of March 19, 2002, the references cited and the examiner's comments thereon have been carefully considered. Applicant wishes to thank the examiner for pointing out the discrepancy between the drawings and specification as well as the Section 112 indefiniteness of some of the original claims. By the within amendment, the specification has been amended to reverse the numerals 51 and 52 in the specification to be compatible with the drawings. It is respectfully submitted that it is not necessary to amend the drawings in view of the amendment to the specification as to the coil and stator laminate.

Considering the claim objections of paragraph 2 of the office action, the bracket which was inadvertently added at the end of claim 23 has been deleted by the within amendment.

Considering now the Section 112 rejections of paragraphs 3 and 4 of the office action, claim 19 has been amended to eliminate reference to the liquid fluid for which there was not antecedent basis, in favor of a definition of the clearance gap being between a sleeve on the rotatable member and a shaft on the base. The clearance gap is thus given definition and it is submitted that claim 19 is now in compliance with Section 112. Similarly, with the addition of the recitation of "shaft on said base" in amended claim 19, reference to said shaft in claim 20 is now appropriate. It is submitted that claims 19-23 are now in compliance with Section 112. Applicant, through undersigned counsel, wishes to thank the examiner for pointing out these initial discrepancies in claims 19 and 20.

Claims 16-18 have been rejected on the Kataoka et al. reference under Section 102(b) (paragraphs 5 and 6) while claims 1-6, 8-15 and 19-23 have been rejected under the provisions of Section 103(a) on Kataoka in view of Stahl et al. Claim 7 has been rejected on the Kataoka et al. reference in view of Stahl et al. as applied to claim 1 and further in view of Takahashi.

It is respectfully submitted that applicant's within disclosure provides for a novel and unobvious means for preloading the rotatable assembly through the provision of the magnetic washer 74 (line 21-23, page 8) in conjunction with the embodiment of Fig. 4.2, the permanent magnet ring 85 (lines 29-30, page 8) in conjunction with the embodiment of Fig. 4.3, the permanent magnet ring 95 (page 9, line 6) in connection with the embodiment of Fig. 4.4, the permanent magnet ring 105 (page 9, line 15) in conjunction with the embodiment of Fig. 4.5 and the magnet washer 124 (page 10, lines 5-6) in conjunction with the embodiment of Fig. 4.7.

Independent claims 1, 9, 16 and added claim 24 are patentably distinct over the art in reciting the construction and mode of operation wherein a magnetic preloading means is provided. In claim 1, the magnetic device recited is operated by an electrical current for moving the rotatable assembly away from the base as the motor is placed in operation. Prior to operation of the motor, such as during shipping of the motor to a location of use, a magnetic preloading means is provided which includes a permanent magnet for preventing free movement of the rotatable assembly when the current is not supplied to the magnetic device. Claim 9 has been amended to include the recitation of the rotatable assembly supported by the base, a magnetic device operable on the supply of electric current for moving the rotatable assembly away from the base, as the motor is placed in use, and applicant's provision of a permanent magnet preloading means for magnetically preloading the rotatable member relative the base to prevent free movement of the rotatable member relative the base when the magnetic is not operable by an electric current.

Claim 16 has been amended to recite that the magnetic device is operable by an electric current for moving the rotating member away from the base so the rotatable member is less supported by the base during rotation of the rotatable member, as during operation of the spindle motor, together with applicant's novel and unobvious permanent magnet preloading means for magnetically preloading the rotatable member relative the base to prevent free movement of the rotatable member relative the base when the magnetic device is not operable by an electric current.

Newly added claim 24 recites in the environment of a spindle motor having a base plate, a rotatable assembly supported by the base plate, a provision of a first magnet means including a stator coil and magnet operated by a control circuit for supplying electrical current to the coil for

generating an axial force to separate the rotatable assembly of the spindle motor from the base plate before the rotatable assembly rotates on operation of the motor. A second magnetic means is recited including a permanent magnet mounted to the rotatable assembly so as to provide a magnetic preloading on the assembly which prevents free movement of the assembly when the current is not being supplied to the first magnetic means. This allows for maintaining the rotating member secured to the base plate during shipping of the spindle motor before use and, as recited at page 8, line 18 through page 9, line 19 generates additional thrust and journal bearing forces to stabilize the bearing system during operation of the motor. It is thus submitted that each of the retained claims and added claim are patentably distinct over the art of record. Reconsideration and allowance of all claims presented is respectfully requested.

The Commissioner is hereby authorized to charge any additional filing fees under 37 C.F.R. § 1.16, or application processing fees under 37 C.F.R. § 1.17, which may be required now or during the pendency of this application, or credit any overpayment to Account No. 16-2230.

Respectfully submitted,

Dated: June 17, 2002

Guy Porter Smith, Reg. No. 20,142
OPPENHEIMER WOLFF & DONNELLY LLP
2029 Century Park East, Suite 3800
Los Angeles, California 90067
(310) 788-5000

MARKED UP COPY OF THE SPECIFICATION TO SHOW CHANGES

The magnetic starting/stopping device comprises a stator lamination [51] 52, a coil [52] 51 and a magnetic platter 53. By a control circuit, at the starting moment, current is supplied to coil 52, which together with magnetic platter 53 generates an axial force to separate the whole rotary sub-assembly of the spindle from the base sub-assembly rapidly before the spindle rotates. While in stopping process, the magnetic force generated by the starting/stopping assistant device holds the rotating portion of the spindle motor quickly and helps the spindle motor to reach steady state in shorter time. Therefore, the device effectively reduces the friction and wear of thrust bearings, resulting in fast starting/stopping, and results in a worn particle free condition. Together with the oil sealing devices 41 and 42, the contamination free condition is safely guaranteed.

MARKED UP SET OF THE CLAIMS TO SHOW CHANGES

1. (Amended) An electric spindle motor, comprising:

a base plate;

a rotatable assembly including a rotatable sleeve extending substantially perpendicular from said base plate along a rotational axis, wherein said rotatable assembly is supported by said base plate;

a stationary shaft securely coupled to said base plate, and extending within said sleeve along said rotational axis and spaced therefrom to define a first clearance gap;

a liquid situated within said first clearance gap for providing at least radial stiffness for said rotatable sleeve;

a thrust plate securely coupled to said base plate;

a thrust bearing securely coupled to said rotating assembly, wherein said thrust bearing is shaped complementary with said thrust plate and spaced apart therefrom to form a second clearance gap;

a gas fluid situated within said second clearance gap for providing at least axial stiffness for said rotatable assembly;

a stator for causing the rotation of said rotatable assembly; [and]

a magnetic device operated by an electrical current for moving said rotatable assembly away from said base plate substantially along said rotational axis so that said rotatable assembly is less supported by said base plate during rotation of said rotating assembly, and

a magnetic preloading means including a permanent magnet for preventing free movement of said rotatable assembly when said current is not supplied to said magnetic device.

2. (Amended) The electric spindle motor of claim 1, wherein said magnetic device comprises a stator lamination with coil securely coupled to said base plate and a magnetic plate securely coupled to said rotatable assembly, and said magnetic preloading means permanent magnet is mounted to said magnetic plate.

9. (Amended) An electric spindle motor, comprising:

a base plate;

a sleeve extending substantially perpendicular from said base plate along a rotational axis;

a shaft extending within said sleeve along said rotational axis and spaced therefrom to define a clearance gap;

a liquid fluid situated with said clearance gap for providing at least radial stiffness for said sleeve; [and]

at least one magnetic seal to reduce leaking of said liquid fluid from said clearance gap;

a rotatable assembly supported by said base plate;

a magnetic device operable on the supply of electrical current for moving said rotatable assembly away from said base plate substantially along said rotational axis so that said rotating assembly is less supported by said base plate during rotation of said rotating assembly; and

a permanent magnet preloading means for magnetically preloading said rotatable assembly relative said base plate so as to prevent free movement of said rotating sub-assembly relative said base plate when said magnetic devise is not operating.

13. (Amended) The electric spindle motor of claim 12, wherein said magnetic device comprises a stator lamination with coil securely coupled to said base plate and a magnetic plate securely coupled to said rotatable assembly; and said permanent magnet preloading means includes a permanent magnet mounted to said magnetic plate.

16. (Amended) An electric spindle motor, comprising;

a base;

a rotatable member supported by said base and extending therefrom along a rotational axis; [and]

a magnetic device operable by an electric current for moving said rotating member away from said base substantially along said rotational axis so that said rotatable member is less supported by said base during rotation of said rotatable member; and

a permanent magnet preloading means for magnetically preloading said rotatable member relative said base to prevent free movement of said rotatable member relative said base when said magnetic device is not operable by an electric current.

19. (Amended) The electric spindle motor of claim 16, further including at least one magnetic seal [to reduce leaking of said liquid fluid from said] in a clearance gap between a sleeve on said rotatable member and a shaft on said base.

23. (Amended) The electrical spindle motor of claim 19, where said magnetic seal provides an electrical path for discharging static charges from a surface of disc disposed on said rotatable assembly.[]]